ResearchGate

See discussions, stats, and author profiles for this publication at: https://www.researchgate.net/publication/373114034

Students' Perception about Collaboration, Social Interaction, and Flexibility in Flipped Learning: a Study

Article · July 2023

DOI: 10.5281/zenodo.10471844

CITATIONS
0

READS
169

3 authors:

Mirza Shahzan Asagar
National Islamic University
8 PUBLICATIONS **0** CITATIONS
SEE PROFILE

Ilfa Zaidi
National Islamic University
2 PUBLICATIONS **0** CITATIONS
SEE PROFILE

Harjeet Kaur Bhatia
National Islamic University
21 PUBLICATIONS **17** CITATIONS
SEE PROFILE

All content following this page was uploaded by Mirza Shahzan Asagar on 14 August 2023.

The user has requested enhancement of the downloaded file.

Students' Perception about Collaboration, Social Interaction, and Flexibility in Flipped Learning: a Study

Ilfa Zaidi, Mirza Shahzan Asagar and Harjeet Kaur Bhatia

Abstract

Flipped learning is a new way of learning that encourages students to participate actively in their own learning process. It facilitates a flexible learning environment, collaboration and social interaction through hands-on activities, group projects, and online platforms. Hence, some of the advantages of flipped learning are attracting researchers to conduct more studies on flipped learning in different contexts. Therefore, this study attempted to see how flipped learning affects senior secondary school students. The study was conducted on a sample of 60 senior secondary school students from two private schools in Delhi selected on a convenience basis. The questionnaire was administered to elicit responses from the students. Findings revealed that students' responses were positive that flipped learning provided them opportunities of collaboration, social interaction, and flexibility in their learning style. This indicates that students were happier with their learning in a flipped environment.

Key Words: Flipped Learning, Social Interaction, Learning environment, Active Learning, Collaboration, Flexibility

Introduction

Flipped learning has gained significant attention in educational research and practice as an innovative approach that emphasizes the active participation of students in their own learning process. It addresses the changing demands of our education system. Aljaraideh (2019) stated that flipped learning is the learning in which a teacher gives students fundamental knowledge before class, allowing teachers and students to focus more on higher-order thinking skills. Seery (2015) identified flipped learning as a constructivist approach which encourages active learning, structured activities, and student engagement through various in-class work management and bridging activities. The key element of flipped learning is to provide flexibility regarding time, space, and individualized learning experiences. Students have the freedom to learn the material at their own pace in preferred learning environment (Nouri, 2016). It also improves students' understanding and responsibility as students take responsibility for their learning when they are at home (Aidoo et al., 2022). Zainuddin and Halili (2016) also mentioned that flipped learning allows students to read learning materials according to their flexible time and pace. As a result, students will spend less time on listening to extensive lectures and more time solving issues individually or collaboratively with peers. It gives personalized

Ilfa Zaidi, Ph.D. Research Scholar, Department of Educational Studies, Jamia Millia Islamia, New Delhi, Delhi, India.
Mirza Shahzan Asagar, M.Ed. Student, Department of Educational Studies, Jamia Millia Islamia, New Delhi, Delhi, India.
Harjeet Kaur Bhatia, Professor, Department of Educational Studies, Jamia Millia Islamia, New Delhi, Delhi, India.

learning experiences and accommodates diverse learning styles and preferences (Sohrabi & Iraj, 2016). Furthermore, Koehler et al. (2013) mentioned that for the success of flipped learning there should be a balance between three key areas in the classroom, i.e., content delivery, pedagogical understanding, and technological integration.

According to Hwang et al. (2022), flipped learning has many benefits for students, including improving their motivation, critical thinking skills, and self-efficacy. It also encourages peer interactions, problem-solving, and collaboration among students (Ramirez & Salas, 2021), while enhancing their knowledge and skills (Karabulut-Ilgu et al., 2018). Flipped learning has been shown in several studies to increase student interactions and engagement, with participants reporting improved interactions with instructors and classmates (Chen et al., 2014; Hung, 2015). This leads to more opportunities for collaboration, classroom discussions, and problem-solving (Love et al., 2014; McLaughlin et al., 2013). Furthermore, flipped learning allows for structured independent learning, with teachers able to provide feedback and assistance through innovative resources and learning management systems, while also implementing collaborative problem-solving activities and group discussions in face-to-face lessons (Or et al., 2022). Students may be taken to the middle level of Bloom's Taxonomy from lower level. Instead of helping them at only lower levels, i.e., knowledge and comprehension, these levels may be catered to by pre-class activities. Now teachers may help them to be at application and analysis level by taking up these activities in the class and be with them to support them when they need scaffolding. The planning of pre-class and in-class activities may help students to reach higher levels of Bloom's Taxonomy and thereby engage in meaningful discussions that can develop critical thinking skills in students.

Hence, Flipped learning provides a dynamic and interactive learning environment where the teacher gives the learning material to the learners before entering the school so that they can read the material at their convenience and discuss it later in the classroom. This study is conducted to see the perception of students regarding collaboration, social interaction, and content flexibility in flipped learning which can help inform future teaching practices.

Context of the Study

This research was carried out on two Private Schools of Delhi because flipped learning approach has been practised in these schools. The Senior secondary students were the primary focus of this study, i.e., students who are studying in grade 11^{th} and 12^{th}.

Need for the Study

The increasing development of digital technologies and their application in education facilitates new learning ecologies that offer students new web-based learning opportunities and resources. This rapid spread of interactive technologies has facilitated the adoption of innovative approaches in higher education that help to promote collaborative learning, exploration, and research in online networked learning environments (Campillo-Ferrer & Miralles-Martínez, 2021). The Horizon Report focuses on exploring and reporting emerging technology in education, the flipped classroom has been highlighted as an emerging technology for higher education which is very important to use at college level (Johnson et al., 2013).

India's National Education Policy (2020) emphasises the need to focus on experiential and immersive learning, which is exactly what flipped learning aims to achieve. It allows them to progress through their studies at their own pace and accumulate credits in the Academic bank of credits towards their degrees and ensures that every student has equal access to education, regardless of their background or circumstances. The flexibility required in this kind of context, may be enhanced by use of flipped learning. The goal of NEP is to provide students with a more well-rounded and effective educational experience which involves innovative use of technology including flipped learning (NEP 2020: The Journey so Far - Times of India, 2022).

Some research studies have shown positive effects of the flipped classroom model in teaching and learning activities. For example, Davies et al. (2013) compared the traditional, simulation-based, and flipped classrooms in a college-level introductory spreadsheet course. It required students to read and comprehend the learning during pre-class activities, such as watching a video or studying lecture notes beforehand. As a result, it decreases the learning burden of students in schools. Nouri (2016) found that flipped learning promotes student engagement that results in active learning in higher education. McLaughlin et al. (2013) mentioned that students can enrich the dialogue with their friends both inside and outside the class because the activity of teaching-learning in a flipped classroom is not just limited to behind the classroom wall which may result in giving students flexibility and more opportunities for collaboration, while also ensuring that they are active and interacting.

It increases motivation and creates more supported learning processes due to teacher and peer scaffolding in and out of class. Campillo-Ferrer and Miralles-Martínez (2021) found that students have a strong inclination towards flipped learning because of flexibility, easy access to online academic resources, and interactive learning environment. Murray et al. (2015) stated that flipped learning allows students to watch the video at a time that suits their schedule and learning needs. Furthermore, Seery (2015) stated that flipped learning facilitates an active learning environment where students can build new ideas. Aidoo et al. (2022) indicated in his study that students like the convenience and accessibility of the video lectures outside standard learning hours in school.

However, some studies have criticized flipped classrooms as being ineffective as they rely much on students' attitudes towards video lectures (Kettle, 2013), lack of out of class support (Bhagat et al., 2016), low self-regulatory abilities, inability to ask questions during out of class learning and an increased amount of learning tasks (Wang, 2016). Agung and Surtikanti (2020) highlighted some technology-based problems when they found that most students surveyed were not enthusiastic about online learning mainly due to lack of access to the internet and other technological resources, which may be revealing the problem of the digital divide.

The educational institutions have adopted flipped learning in recent years, and it is worthwhile to examine how the users have perceived such a change (Or et al., 2022). The studies reviewed indicated that though research on student perception of the flipped classroom approach had been conducted at higher education level, there are limited studies on perception and the nature of student experiences related to the flipped classroom approach at senior secondary level. This research gap can be filled by exploring how senior secondary students perceive flipped learning.

Objective of the Study

1. To study the students' perceptions about Flipped learning in terms of:
   a. Collaboration during in-class activities
   b. Social interaction
   c. Flexibility in content/instructional material

Research Methodology

Sample

This research employed a convenience sampling technique to select sixty senior secondary students from two private schools in Delhi because flipped learning was being practiced in these schools.

Questionnaire

Researchers developed a questionnaire by adapting items from studies Bhagat et al. (2016), Karabulut-Ilgu et al. (2018). The permission from these authors was also sought to use the items in their study for the present study. Apart from this, studies done by Aidoo et al. (2022), Ramirez and Salas (2021), So and Brush (2008) were also consulted by the researchers for developing the questionnaire. The questionnaire consisted of two parts.

Part I: aimed to assess students' perceptions about flipped learning. It comprised seventeen items based on a 5-point Likert scale from "strongly agree" to "strongly disagree". Specifically, there were six questions related to collaboration, four questions were about social interaction, and seven questions were about flexibility in terms of time management, material availability, and the learning environment.

Part II: This part had two open-ended questions about students' perception about flipped learning.

Analysis and interpretation of data

Data was collected via Google Form. Then, it was analysed by calculating percentage, mean and standard deviation with the help of SPSS software. Whereas open-ended questions were analysed through coding. Analysed data was presented in tables and graphs. Lower and upper limit of the 5-point Likert-type scale was also calculated by the researchers to equal the range of the cells (Shah et al., 2022).

Table 1 Scoring range of the Likert scale of the survey.

SCALE	Lower Limit	Upper Limit
Strongly Disagree	1	1.80
Disagree	1.81	2.60
Neutral	2.61	3.40
Agree	3.41	4.20
Strongly agree	4.21	5.00

Findings and Discussion

The findings of the study are presented here:

Objective 1.a. To study the students' perceptions about flipped learning in terms of collaboration during in-class activities.

Focus of this dimension was to examine the collaboration while participating in in-class activities in a flipped learning environment.

Table 2 **Students' responses regarding collaboration during in-class activities in flipped learning.**

Items	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean	Standard Deviation
	(In Percentage)						
Flipped learning enhances communication with my classmates.	36.7	53.3	10	0	0	4.27	0.63
Flipped learning helps me feeling like I belong to a learning community.	36.7	40	20	1.7	1.7	4.08	0.89
Flipped learning helps me participate actively in group discussions with peers.	41.7	40	16.7	1.7	0	4.22	0.78
Flipped learning helps me develop new skills and knowledge from peers.	40	38.3	18.3	3.3	0	4.15	0.84
Flipped learning allows me to learn and understand the perspective of my classmates from diverse backgrounds, which helps me understand how something can be viewed differently.	46.7	38.3	13.3	0	1.7	4.28	0.83
Flipped learning helps me in developing problem-solving skills through peer collaboration.	33.3	40	25	1.7	0	4.05	0.81
Overall						**4.18**	**0.8**

From the data presented in Table 2, the statement "*Flipped learning allows me to learn and understand the perspective of my classmates from diverse backgrounds"* (Mean=4.28; SD=0.83) shows the highest mean and "*flipped learning enhances communication with my classmates*" (Mean=4.27; SD=0.63) shows the second-highest mean. This mean value indicates that students strongly agreed, and the standard deviation indicates that their responses were more homogeneous on these statements. This finding is consistent with the study by Sohrabi and Iraj (2016) which suggests that flipped learning provides opportunities for promote understanding and appreciation of diverse perspectives among students. This method also fosters a collaborative learning environment by encouraging learning experiences for different student subgroups.

However, the statement "*Flipped learning helps me in developing problem-solving skills through peer collaboration*" (Mean=4.05; SD=0.81) shows the lowest mean and standard deviation indicates that students' responses were quite homogeneous on this statement. Moreover, the statement "*Flipped Learning helps me feel like I belong to a learning community*" (Mean=4.08; SD=0.89) shows the second lowest mean. It means students found agreed with this statement but the standard deviation suggests that their responses were heterogeneous as compared to the other statements of this dimension. Teachers could consider providing multiple avenues for problem-solving to accommodate individual learning preferences, such as offering written or visual explanations in addition to video lectures. These results are consistent with previous studies by Karabulut-Ilgu et al. (2018); Ramirez and Salas (2021) in which it is pointed out that flipped learning engages the learners in collaborative work and fosters their development through active participation.

The overall mean value of this dimension (mean=4.18; SD=0.8) indicates that the respondents agreed that flipped learning enhances their collaboration during in-class activities. Aidoo et al. (2022); Campillo-Ferrer & Miralles-Martínez (2021); Love et al. (2014) have found that flipped learning has positive impacts on students' learning, critical thinking, and provides opportunities to collaborate with each other in education.

Objective 1.b. To study the students' perceptions about flipped learning in terms of social interaction.

The aim of this dimension was to see the perceptions of senior secondary students about social interaction in a flipped environment.

Table 3 Students' responses regarding social interaction in Flipped Learning.

Items	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean	Standard Deviation
	(In percentage)						
Flipped learning allows me to spend more time interacting with my classmates.	31.7	43.3	16.7	5	3.3	3.95	1
Flipped learning allows me to spend more time interacting with my teachers.	30	33.3	31.7	5	0	3.88	0.9
Flipped learning allows me to interact with classmates in and outside of class through online platforms.	35	38.3	20	6.7	0	4.02	0.91
Flipped learning allows me to interact with teachers in and outside of class through online platforms like discussion boards.	26.7	40	25	0	8.3	3.77	1.11
Overall						**3.9**	**0.98**

Data presented in Table 3 indicates that the statement "*Flipped learning allows me to interact with classmates in and outside of class through online platforms*" (Mean=4.02; SD=0.91) has the highest mean. Moreover, the statement "*Flipped learning allows me to spend more time interacting with my classmates*" (Mean=3.95; SD=1.0) shows the second highest mean. Mean of these statements denoted that the students agreed on them. However, standard deviation indicates less homogeneity in the respondents' views. Findings are in line with the study of McLaughlin et al. (2014) in which it is mentioned that flipped learning promotes interaction and builds confidence in students by engaging them in group activities and discussion during class time.

On the other hand, the statement "*Flipped learning allows me to interact with teachers in and outside of class through online platforms like discussion boards*" (Mean=3.77; SD=1.11) has the lowest mean value in this dimension. It shows students agreed with this, and the standard deviation indicates that the participants' responses were more heterogeneous. To address this, the teacher should provide more guidance on how to effectively use these online tools and offer more feedback and support to students who are struggling to engage with which would help the students feel more connected and engaged with their coursework, both inside and outside of class. These findings are consistent with the studies of Hwang et al. (2022); Sohrabi and Iraj (2016); and Zainuddin and Halili (2016), in which it was asserted that teachers allocate additional time to students for learning that impacts their academic achievement level positively.

Table 4 **Students' responses regarding flexibility in content/instructional material in Flipped Learning**

Items	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean	Standard Deviation
	(In Percentage)						
Flipped learning provides adequate material beforehand	15	41.7	31.7	6.7	5	3.55	1
Flipped learning helps me know what to read before class and how much.	23.3	36.7	31.7	3.3	5	3.7	1.03
Flipped learning facilitates more time to study.	26.7	33.3	28.3	5	6.7	3.68	1.13
Flipped learning facilitates me to view online content (ppts, videos, etc.) as often as I need.	20	46.7	28.3	5	0	3.82	0.81
Flipped learning allows me to learn as per my convenience outside the class.	21.7	33.3	36.7	5	3.3	3.65	0.99
Flipped learning helps me to stay motivated and engaged in the course when in and outside of the classroom.	25	40	31.7	3.3	0	3.87	0.83
Flipped learning allows me to manage my time effectively when at home.	18.3	40	31.7	5	5	3.62	1.01
Overall						**3.7**	**0.98**

From the data presented in Table 4, the statement, "*Flipped learning helps me to stay motivated and engaged in the course when in and outside of the classroom*" (Mean=3.87; SD=0.82) shows the highest mean followed by the statement "*Flipped learning facilitates me to view online content as often as I need*" (mean=3.82; SD=0.81). This mean value indicates that students agreed, and the standard deviation indicates that their responses were more homogeneous on these statements. Additionally, the statement "*Flipped learning helps me know what to read before class and how much*" (mean=3.70; SD=1.03) mean shows that students agreed with these statements. The computed standard deviation of the item indicates more heterogeneity in the responses provided by the students. Magaña et al. (2022), Lo and Hew (2017) also affirmed that the utilisation of pre-class materials in conjunction with the pedagogical approach of flipped learning could foster a learning environment that is student-centred and promote self-directed learning.

The overall mean value of this dimension (mean=3.90; SD=0.98) indicates that the students agreed that flipped learning enhances social interaction in the class.

Objective 1.c. To study the students' perceptions about flipped learning in terms of flexibility in content/ instructional material.

The purpose of this dimension was to see the perception of students about flexibility in the content/material provided to them by the teacher in flipped learning.

Moreover, the statement "*flipped learning provides sufficient pre-course material*" (Mean=3.55; SD=1.00) shows the lowest mean followed by the statement "*Flipped learning enables effective time management while at home*" (Mean=3.62; SD=1.01). So, this mean value denotes that students agreed on these statements, but the standard deviation implies that participants' responses were more heterogeneous on these statements. In order to maximise student achievement, teachers must assign reasonable amounts of pre-class work and offer extra assistance to those who may find it challenging. Additionally, encouraging open communication and discussion among students can boost student motivation and engagement.

The overall mean value of this dimension (mean=3.7; SD=0.98) indicates that the respondents agreed with the concept that flipped learning provides flexibility in content/instructional material. However, among all three dimensions (collaboration, social interaction, and flexibility in content), overall mean was highest for collaboration, i.e., 4.18 and least for flexibility, in content i.e., 3.70. Hence, emphasis should be given on flexibility in content/instructional material for making flipped learning more effective.

Findings of open-ended questions

Two open-ended questions were also asked by the students. The first question was about how flipped learning has changed their learning and comprehension of the subject matter.

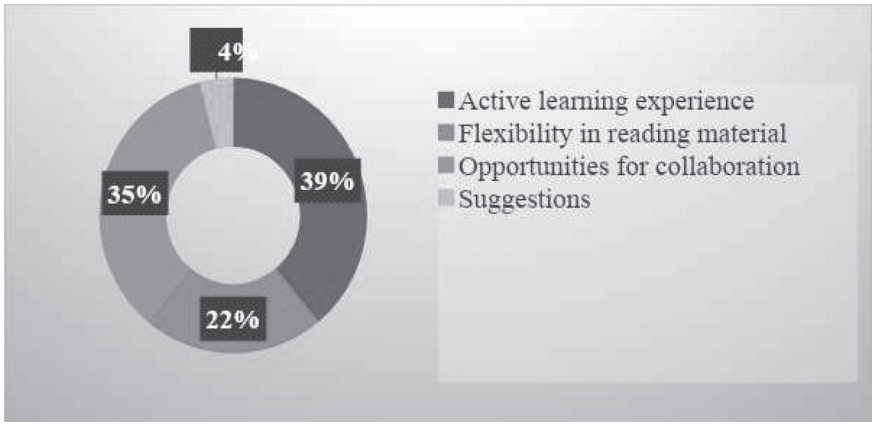

Figure 1 Responses of participants about the impact of flipped learning on their learning process and comprehension of the subject matter.

Figure 1 shows that a significant proportion of participants (39%) stated that active learning helps them to learn and build understanding about the subject. As one respondent stated, "*I feel confident when I put views in class."* Another participant documented, "*Better discussions related to the topic enhance the understanding of the topic, and different opinions expand the viewpoint."* Moreover, 22% of participants mentioned that

due to flexibility in reading material it is easy to learn. As one respondent reported, "*I clear my doubts that I read at home" and another student* stated, *"Easy access to quick notes."* However, 35 % students mentioned flipped learning provide the opportunities for collaboration. A responded stated that "*I enjoy participating in class activities in which we learn many things through group collaboration."* While 4% respondents suggested ways to improve flipped learning. Like one student wrote, *"Give enough study material to study."*

Second open-ended question was about how they handle pre-class work and how it helps them preparing for class discussions and activities.

Figure 2 *Responses of students about how they handle pre-class work and how it helps them preparing for class discussions*

Figure 2 showed that 38% of respondents answered that flipped learning build confidence in them and provide easiness in the knowledge through pre-class material. One respondent reported, "*I felt comfortable and confident because I know already what teacher will teach me in the class."* Additionally, 22% of the participants indicated that engaging in pre-class work resulted in advantages such as "*effective time management and active involvement in class discussions*". A small proportion of participants, i.e., 2.5% reported that pre-class material motivated them for learning. However, 25% respondents provided a response by stating, "*I do not know*" or "*not know*." Furthermore, 12 % participants indicated that engaging in pre-class work has made them accountable because of remote and self-paced learning. One student reported that "*As much as it makes me accountable and independent by learning and gathering pre-class knowledge through self-study.*"

Conclusion

In short, this study found that flipped learning approach affects the learning and engagement of senior secondary school students positively. It fosters interpersonal communication in students and enables them to collaborate during face-to-face sessions by providing educational materials before entering the classroom. In addition, the research revealed that respondents found flipped learning favourably, mentioning its potential to increase interaction with teachers and peers and to provide a flexible learning environment. The students perceived flipped learning helped them the most in the collaboration, followed by social interaction and then flexibility. There needs to be sensitization of teachers towards the perspective of the students so that the teachers may further strengthen flipped learning for collaboration and provide more opportunities to

the students for social interaction and flexibility, as in the contemporary context these dimensions assume great significance. This research also suggested that it is prudent to take feedback from students so that effectiveness of flipped learning can be improved.

Bibliography

Agung, A. S. N., & Surtikanti, M. W. (2020). Students' Perception of Online Learning during COVID-19 Pandemic: A Case Study on the English Students of STKIP Pamane Talino. SOSHUM : *Jurnal Sosial Dan Humaniora, 10*(2), 225–235. doi:10.31940/soshum.v10i2.1316

Aidoo, B., Vesterinen, V.-M., Macdonald, M. A., Gísladóttir, B., & Pétursdóttir, S. (2022). Perceptions of Ghanaian Student Teachers on Benefits and Challenges of the Flipped Classroom: A Case Study. *Contemporary Educational Technology, 14*(4), ep377. doi:10.30935/cedtech/12163

Aljaraideh, Y. (2019). Students' perception of flipped classroom: A case study for private universities in Jordan. *Journal of Technology and Science Education, 9*(3), 368. doi:10.3926/jotse.648

Bhagat, K. K., Chang, C.-N., & Chang, C.-Y. (2016). The impact of the flipped classroom on mathematics concept learning in high school. *Educational Technology & Society, 19*(3), 134–142. Retrieved from https://www.jstor.org/stable/jeductechsoci.19.3.134

Campillo-Ferrer, J. M., & Miralles-Martínez, P. (2021). Effectiveness of the flipped classroom model on students' self-reported motivation and learning during the COVID-19 pandemic. *In Humanities and Social Sciences Communications, 8(*1). doi:10.1057/s41599-021-00860-4

Chen, Y., Wang, Y., Kinshuk, & Chen, N. S. (2014). Is FLIP enough? or should we use the FLIPPED model instead? *Computers and Education, 79,* 16–27. doi:10.1016/j.compedu.2014.07.004

Colomo Magaña, A., Colomo Magaña, E., Guillén-Gámez, F. D., & Cívico Ariza, A. (2022). Analysis of Prospective Teachers' Perceptions of the Flipped Classroom as a Classroom Methodology. *Societies, 12*(4), 98. doi:10.3390/soc12040098

Davies, R. S., Dean, D. L., & Ball, N. (2013). Flipping the classroom and instructional technology integration in a college-level information systems spreadsheet course. *Educational Technology Research and Development, 61(*4), 563–580. doi:10.1007/s11423-013-9305-6

Hung, H.-T. (2015). Flipping the classroom for English language learners to foster active learning. *Computer Assisted Language Learning, 28*(1), 81–96. doi:10.1080/09588221.2014.967701

Hwang, G.-J., Chen, C.-H., & Chen, W.-H. (2022). A concept mapping-based prediction-observation-explanation approach to promoting students' flipped learning achievements and perceptions. *Educational Technology Research and Development, 70*(4), 1497–1516. doi:10.1007/s11423-022-10106-y

Johnson, L., Adams Becker, S., Cummins, M., Estrada, V., Freeman, A., Ludgate, H., New Media Consortium., & EDUCAUSE. (2013). The NMC Horizon Report: 2013 Higher Education Edition. *New Media Consortium*, 44.

Karabulut-Ilgu, A., Yao, S., Savolainen, P., & Jahren, C. (2018). Student Perspectives on the Flipped-Classroom Approach and Collaborative Problem-Solving Process. *Journal of Educational Computing Research, 56*(4), 513–537. doi:10.1177/0735633117715033

Kettle, M. (2013). Flipped physics. *Physics Education, 48*(5), 593–596. doi:10.1088/0031-9120/48/5/593

Koehler, M. J., Mishra, P., & Cain, W. (2013). What is Technological Pedagogical Content Knowledge (TPACK)? *Journal of Education, 193*(3), 13–19. doi:10.1177/002205741319300303

Lo, C. K., & Hew, K. F. (2017). A critical review of flipped classroom challenges in K-12 education: possible solutions and recommendations for future research. *Research and Practice in Technology Enhanced Learning, 12*(1), 1–22. doi:10.1186/S41039-016-0044-2/TABLES/9

Love, B., Hodge, A., Grandgenett, N., & Swift, A. W. (2014). Student learning and perceptions in a flipped linear algebra course. *International Journal of Mathematical Education in Science and Technology, 45*(3), 317–324. doi:10.1080/0020739X.2013.822582

View publication stats